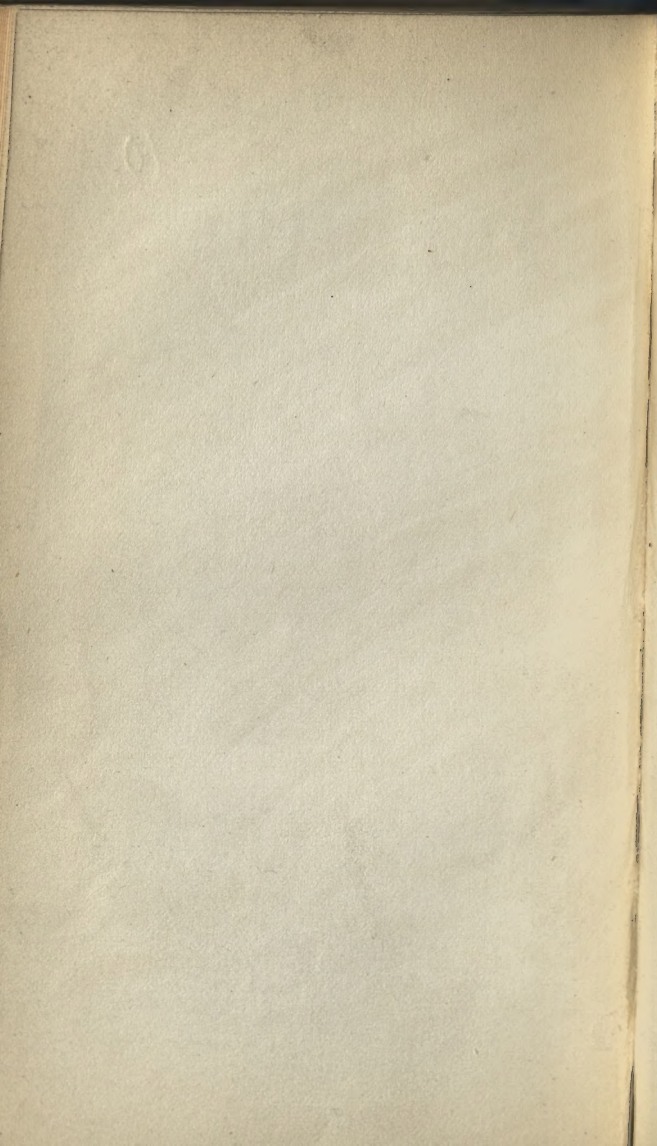


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A COMPENDIUM
OF
PHOTOGRAPHY.

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FOURTH EDITION.  
~~~~~

PUBLISHED BY
FREDERICK COX,
OPTICIAN,
And Manufacturer of Photographic Apparatus,
22, SKINNER STREET, SNOW HILL,
LONDON, E.C.



77

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A COMPENDIUM
OF
PHOTOGRAPHY,
CONTAINING
SIMPLE AND CONCISE DIRECTIONS
FOR THE
POSITIVE AND NEGATIVE COLLODION,
AND
Printing on Albumenized Paper Processes,
WITH INSTRUCTIONS FOR TAKING
STEREOSCOPIC PICTURES,
AND THE
METHOD OF COLOURING PHOTOGRAPHS.

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AND

PRINTING ON ALBUMENIZED PAPER

J. S. FORSAITH, PRINTER
BETHNAL GREEN ROAD.

FOURTH EDITION

FREDERICK COX,

OPTICIAN,

MANUFACTURER OF PHOTOGRAPHIC APPARATUS,

22, SKINNER STREET,

KNOW HILL, LONDON, E.C.

PREFACE

TO THE THIRD EDITION.

IN preparing a third edition of this Compendium, the main object (*simplicity*) has been steadily kept in view. It is entirely intended to be a hand-book to those who either are totally ignorant of the Photographic process, or else have become involved in difficulties that they are unable to surmount; all technical and remote allusions have been carefully avoided, and one, and as far as practicable only one, formula has been given. It is not intended to mean that only these proportions will succeed, but they are the proportions that are most likely to be successful in the hands of those who have not had the experience to enable them to account for peculiarities that will arise in all branches of Photography.

The alterations in the Dry Collodion Manipulation will render this important process more easy of accomplishment. The Colouring of Photographs has also undergone revision, and is the substance of all that can be said on this subject; the taste of the artist alone is wanted to produce contrast with harmony.

The method of taking Stereoscopic Pictures is one of

the most pleasing ways of using the art of Photography, and its simplicity is quite equal to the other processes.

Having erected a glass house on my new premises, I am enabled to give such practical information as may be required.

In the Price List will be found the prices of the most perfect Instruments that are made for this pleasing amusement, and are as low as is compatible with first class workmanship.

To purchasers an Elementary Lesson will be given gratuitously.

22, SKINNER STREET,

F. J. C.

August, 1856.

PREFACE

TO THE FOURTH EDITION.



IN the present edition of this Work I have thought it advisable to strictly adhere to the Positive and Negative Collodion Processes, and omitting the Chapters on the Dry Collodion and Waxed Paper ; by this means, I shall have at my disposal more space to enter into the explanation of Failures, with their causes and remedies. Those who are desirous of practising Photography, as applicable to Landscapes or Out-door work, are referred to *The Photographic Tourist*, which will supply the fullest information regarding the Dry Collodion and Preservative Processes.

PREFACE

It is the present edition of this Work I have thought it advisable to strictly adhere to the Positive and Negative Collodion Processes, and omitting the Chapters on the Dry Collodion and Waxed Paper; by this means, I shall have at my disposal more space to enter into the explanation of Failures, with their causes and remedies. Those who are desirous of practising Photography, as applicable to Landscapes or Out-door work, are referred to The Photo-graphic Tourist, which will supply the fullest information regarding the Dry Collodion and Preservative Processes.

INTRODUCTION.

IN the various processes that have been from time to time in vogue for producing impressions on prepared surfaces by the agency of light, Silver has been the basis; as early as the 16th century, the blackening of Chloride, or (as it was then called,) Horn Silver, being well known to the Alchymists, yet no positive steps to turn this discovery to advantage appear to have been taken before 1803, when Wedgewood communicated, in a paper to the Royal Institution, a method of producing impressions on paper or white leather, which had been previously coated with Nitrate of Silver. The object to be copied, such as leaves of trees, wings of insects, &c., were to be laid on the prepared paper and exposed to the action of the light; the minute fibres were then found, on removing the leaves, remarkably distinct. The future progress of the art was stayed at this point for some years, the great difficulty being to fix the object, or rather, to prevent the paper from becoming entirely black on exposure to the light.

In the year 1814, Niepce turned his attention to the production of pictures by the aid of the Camera Obscura. For this purpose he coated a metal plate with Asphalte, and exposed it in the Camera; after six or seven hours he discovered a slight effect, but the length of time was a complete bar to its usefulness. Sir Humphrey Davy had previously produced, by the aid of the Solar Microscope, images of small objects on prepared paper. Daguerre and Niepce continued their researches until 1833, by which time they had made considerable progress

in the successful application of Iodine to render the plate sensitive; and early in 1839, Daguerre announced his great invention, for which the Chamber of Deputies awarded him a pension of 6000 francs, and 4000 francs to Isidore Niepce, for the secret of the Daguerreotype, so called in honour to the inventor, considering that for this remuneration, France would make "a gift to the whole world," yet a patent was afterwards taken out in England, by which its adoption in this country was retarded for many years.

About the same time, Mr. Fox Talbot published a method of preparing paper by Chloride of Silver, which was tolerably sensitive, and afterwards fixing the proof by the agency of Chloride of Sodium, (common salt,) the disadvantage of this being, that the white parts obtained a bluish tint in the process. The discovery of Hypo-sulphite of Soda was afterwards made by Sir John Herschel, who likewise recommended the use of Iodide of Potassium in connection with Nitrate of Silver, thereby laying the foundation of "Iodized Paper" which was afterwards made the subject of a patent by Mr. Fox Talbot, in which he used Gallic Acid in connection with the Nitrate of Silver, and by these means accelerated the process as to make it really useful for copying all inanimate objects. After this important step nothing of much interest was discovered until Le Gray made known the Wax Paper process. He also began some experiments on the use of Collodion as a Photographic agent. The suggestion having been taken up in this country by Dr. Dymond, Mr. Archer, and others, was, in a short time, made the favourite and useful means of amusement for all who turned their attention to Photography.

APPARATUS.

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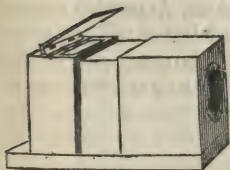


Figure 1.

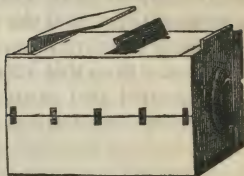


Figure 2.

THE choice of Apparatus required for Photographic manipulation is the most important to a beginner, as without a proper degree of care is used in selecting such as is applicable to the requirements of the process employed, days and weeks of trouble may be consumed, and difficulties encountered which, with ordinary precaution, might have been avoided; if a purchaser is not confident in his own judgment, he had better rely on the respectability of the house that supplies it. The first step is to secure a Camera, which should be made of good seasoned mahogany, or walnut wood; the best kind is that known as an expanding one (fig. 1.) It consists of

a square box, closely fitted, so as to be impervious to light—the back of which is made to slide inside the front part, so as to be applicable for Lenses of different focus ; and, therefore, adapted for Views as well as Portraiture ; the frame that carries the prepared glass or paper is made to fit into the groove, which likewise carries a ground glass to receive the focus : care should be taken that this ground glass is fitted so as to be exactly at the same distance from the Lens as the prepared surface which is to receive the Photographic impression. If required for travelling, the ordinary form is too cumbersome ; and for this purpose, the kind most in vogue is made to fold, (fig. 2) by which means the larger sizes will occupy so small a compass as to pack easily inside a portmanteau ; and the whole of the Apparatus required for taking negative views on waxed Paper will not occupy more room than that afforded by a carpet bag. Having, then, secured an Instrument suited to our requirements, we turn to the selection of a Lens.

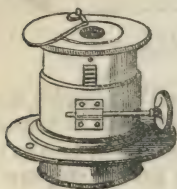


Figure 3.

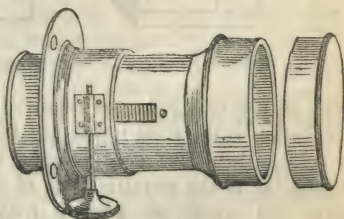


Figure 4.

In the early days of Photography, the ordinary construction of the Camera Lens was a *meniscus*—these do admirably for the simple copying of figures, where length of time is not an object of much importance ; but as the chemical and optical foci do not coincide, there will have

to be an allowance made for this purpose, after the Image has been adjusted on the ground glass of the Camera; this difficulty is overcome by using an *Achromatic*, which is a combination of two glasses—one being made of flint, and the other of crown, by means of which a flatter picture is obtained, together with a much greater degree of sharpness.

For LANDSCAPES, the *Single Achromatic* (fig. 3) is best adapted, as being of a longer focus, the Pictures will be on a larger scale, and likewise more distinct—it possesses so many advantages over the meniscus, as to have almost entirely superseded it.

For PORTRAITS, or any purpose where the objects are likely to move, the *Double Combination Lenses*, (fig. 4) consisting of a set of four glasses mounted in a brass tube, are to be preferred: they possess great rapidity of action; and when really good, give very sharp and clear definition. If the glasses are removed from their cells, in order to be cleaned, it is of the greatest importance that they are replaced in their proper relative positions.

The construction of a Portrait Lens will be understood from fig. 5.

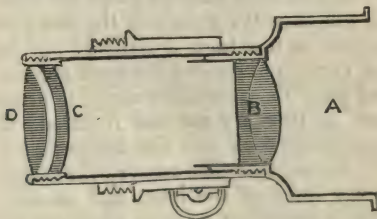
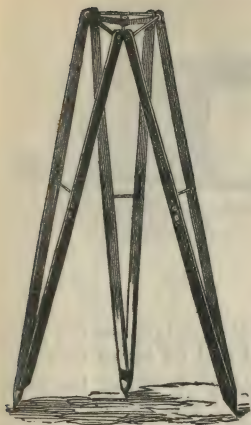
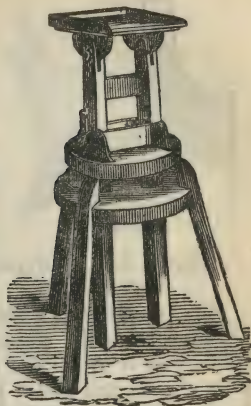


Figure 5.

a represents the hood or front of the brass work; *b*, a

combination of two glasses,—which we will call the *front lenses*. *c* and *d*, the two glasses which may be termed the *back lenses*, and are placed at the end of the tube which screws into the Camera. When placed in position for portraiture, the lens, *b*, (which, although it consists of two glasses, appears like one, as they are cemented together with a transparent gum,) must be placed in its mounting with the convex surface outside, or next the sitter. The two back lenses are easily recognized, as they are of different shapes, one being a *double convex*, that is, thick in the centre and thin at the edge, the other is a *meniscus*, or hollow, like a watch glass. In placing these in their cells, if they have been removed, first put in the double convex, the flattest side to be downwards; over this, the meniscus, with its concave side down or next to the convex: the two glasses are separated or prevented from touching each other by means of a brass ring. When Lenses of this description are to be used for distant objects or views, they do not work so well, in consequence of the impossibility of getting objects at different distances in focus at the same time; but they can be made to adapt for both purposes, at a slight additional cost.

A lens that has been made to adapt for both portraits and views, will have the glasses in the same position for taking portraits as has been described; but to make it suitable for views, you remove the back glasses, *c* and *d*, (fig. 5,) and place them carefully away, to preserve them from injury, as they are not now required; then screw the brass mounting back into the flange that is fixed on the Camera; having done this, unscrew the large brass hood that is in the front of the lens, and reverse the front glasses in their mounting, so as to place the flattest side of the glass outside or next the view; having replaced the brass hood, insert into it a stop or diaphragm, and proceed to work in the usual manner.

*Figure 6.**Figure 7.*

For supporting the Camera, a Stand will be requisite, which should be from three to four feet high; they are made of different descriptions—the ordinary tripod stand, (fig. 6) with a brass screw to fix the Camera with, is the most portable, and is therefore best adapted for travelling. There is another kind with a table-top, moving with a ball and socket motion, by which means the Camera can be placed at any angle; this is also a very convenient form. To use in a room, where portability, &c. is not so much an object, there is nothing equal to the firm Oak stands; (fig. 7) they are heavy, but this is a great advantage, the whole being so solid as to prevent any vibration. Stands are also made in cast Iron, but they are not so steady as good Wooden ones.

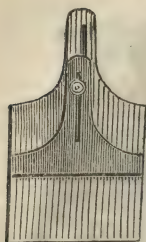
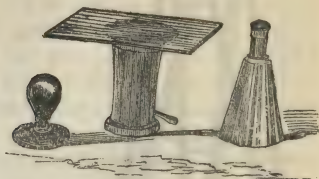


Figure 8.



Figures 9.

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11.

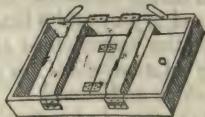
Fig. 8 represents a Plate Holder, for holding the glass plate whilst being cleaned, and will be found very convenient, as it avoids the necessity of touching the glass with the fingers whilst performing this operation; and for large glasses, the Pneumatic Holders (figs. 9 and 10) are required to sustain the plate while applying the Collodion coating. Fig. 10 is of the best description, the vacuum being caused by raising the circular piece of Indiarubber, by means of a brass pin working on a lever.

In obtaining the Focus of the object on the ground glass—an operation of great delicacy, and on which depends, to a very great extent, the sharpness of the resulting picture—it is advisable to employ a Focussing Glass. They are made of two descriptions; the cheapest, in japanned tin, and which magnifies the image to a very considerable extent; but the most perfect form of instrument, is that shown by fig. 11, which not only enlarges the image, but also renders it erect on the ground glass of the Camera, thereby enabling the operator better to judge the results.

*Figure 12.**Figure 13.*

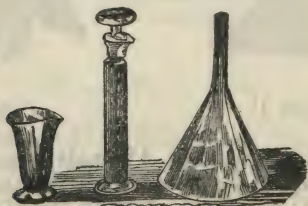
A Dipping Bath, (fig. 12) made of gutta percha, or glass, to contain the nitrate of silver solution, will also be required ; they are used with a slip of glass, or gutta percha, called a Dipper, for more readily inserting the glass plate. These Baths are likewise made of porcelain, which possess some advantages over both the other kinds ; but, like the glass ones, are liable to be broken by accidents.

When wanted for travelling, the water-tight top (fig. 13) will save the trouble of carrying an extra bottle for the solutions, and, likewise, diminish the risk of spoiling the solutions by any foreign matter coming in contact with them.

*Figure 14.*

After having taken a Negative Picture on glass, a Pressure Frame (fig. 14) is required, to produce the paper

copies; they are made of various sizes, one sufficiently large to take the negative with a small margin round it, is recommended, and the back board should be jointed, the utility of which, will be seen from the description of its use, given under the head of Positive Printing, in a future chapter.



Figures 15. 16. 17.

Three or four Glass Measures (fig 15) will be useful to measure the proportions of solutions mentioned in the various processes; they are likewise extremely handy for holding small quantities of the Developing Solution, &c. and floating it on the plate, as it can be poured more steady, by this means, than from the mouth of a bottle.

Fig. 16 is a Collodion Bottle or pourer. Collodion being a preparation that is constantly forming a sediment, this bottle is designed to prevent its being disturbed every time it is used; for the convenience of mixing the collodion and iodizing solution, some are graduated like the measures, into drachms and ounces.

Funnels, (fig 17) are made in glass or gutta percha; several should be at hand, or great care must be exercised to clean them thoroughly each time they are used. They are also required in filtering solutions; for this purpose, take a sheet or circle of filtering paper, and fold it into

four, then again into eight, open it fully and press it into a funnel ; by this means, there will be plenty of vent for the air to escape, otherwise, the paper will be flat against the glass, and prevent the solution from percolating through.



Figure 18.

Fig. 18 represents a Pestle and Mortar for crushing Chemicals, previous to dissolving them ; two or three porcelain pans for washing and preparing paper, some clean linen cloths, and a wash leather, will complete the requisites. The cloths should be rinsed in hot water after they have been washed, in order to free them from any trace of soap that might remain. An elastic India-rubber bottle will be very useful to blow off the dust from the plates after they have been cleaned.

In addition to the apparatus requisite, an operating or dark room is needed. By the term dark room, we mean, not absolutely a dark closet, but one that is protected from the chemical rays of light, in order to preserve the sensitive plate whilst being prepared. The readiest method will be to obtain a small room, with a window facing the north, or otherways shaded from the sun, and to cover the window with several thicknesses of yellow calico, which excludes the chemical rays, yellow light not having any effect upon the sensitive preparations used in Photography ; therefore, by darkening a room by hanging over the window two or three folds of yellow calico, there will be sufficient light to observe the progress of our manipulation, without interfering with its chemical action.

The room selected for this purpose must be kept particularly free from dust and dirt, and a table or bench should be fixed immediately under the window, and into this a sink or basin, with a pipe to convey away the waste water, either direct into the drain or into a pail underneath; a shelf to hold the bottles; and, over head, a zinc or wood tub to contain a supply of water, for washing, &c., which may be conveyed down by a small pipe, fitted with a stop-cock of about $\frac{1}{4}$ -inch diameter; this will furnish a steady stream, and be found much more convenient than pouring it from a jug.

CHEMICALS.

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The Chemicals used in Photography are neither numerous or difficult to obtain, but absolute purity is essential, the delicacy of the process rendering it very susceptible to impurities that may have been introduced during their manufacture; among those required for the

POSITIVE PROCESS ON GLASS

COLLODION is the most important: I have, in previous editions of this work, given a formula for its manufacture: but, the difficulty of producing a satisfactory result, except after long practice, has induced me to omit that description: it is mainly useful as an experiment, which will afford a good practical lesson to the amateur, after he has had some amount of practice, but for elementary purposes, it had better be postponed. Those who wish to try the experiment, are referred to the PHOTOGRAPHIC TOURIST, published by me, where full instructions will be found. It will be sufficient, for our present purpose, to

state that it is formed by dissolving Gun Cotton in a mixture of Sulphuric Ether and Alcohol ; and, after this, Iodized by the addition of Iodide of Ammonia, or other salt ; after this has been added, it begins to decompose, and will not retain its sensitiveness for a very long period ;* and as Collodion is extremely volatile, it must be carefully preserved from the air in close stoppered bottles. Should the Collodion become too thick to flow evenly, over the glass plate, it may be thinned by the addition of a few drops of pure Rectified Ether, until it is sufficiently limpid. It will be as well to remember that it must not be used in the vicinity of a burning candle, or fire, as the vapour might ignite.

NITRATE OF SILVER, for the preparation of the Exciting Bath for this process, may be used in the form of crystals, and, in making solutions in which this salt is employed, *Distilled Water* only should be used.

TRIPOLI, in combination with dilute NITRIC ACID is for the purpose of cleaning the glass plates.

PROTO-SULPHATE OF IRON and NITRATE OF POTASS form one of the best developers I have tried for general use ; there are many formulas for this solution, but the results obtained, are so nearly similar, that unless the operator is very careful, he will not appreciate the difference.

ACETIC ACID varies considerably in strength. The common Acetic of Commerce may be used by increasing the quantity, but the *Glacial Acetic* is recommended. Its use is to cause the solution to flow more evenly over the plate, and likewise to preserve the clearness of the shadows.

ALCOHOL is likewise used for a somewhat similar purpose ; as, by using a portion of this spirit, less acetic is necessary, and the pictures develop with better tones.

*FISHER'S Positive Collodion is an exception to this rule.

CYANIDE OF POTASSIUM, for fixing the picture. As this is a rather dangerous poison, care must be used to prevent accidents, and avoid its entering a scratch or wound on the hands. I do not think, under any circumstances, the weak solution used for fixing, could do any injury, but it is a common practice to rub the hands with a small portion, to remove the stains that are caused by the chemicals that are spilt over them. In preference to using Cyanide, employ Iodide of Potassium, which is perfectly harmless and quite as effective. India rubber finger stalls are made to protect the fingers from stains. *Hypo-Sulphite* of Soda may be used for fixing, but the whites of the picture are not so good.

VARNISH of two kinds are required, viz:—White or Transparent, and Black for backing the picture; the use of the former is to preserve it from injury, either by an accidental scratch or discoloration from the action of the air; and the latter is poured over the back, or plain side of the glass, to form a back-ground, and show up the lights and shadows of the Photograph.

I shall now describe the preparation of the Solutions by the aid of the chemicals before mentioned. The first will be the

CLEANSING SOLUTION.

| | | | | |
|-------------|-------|-------|-------|------------|
| Tripoli | ..... | ..... | ..... | 2 drachms. |
| Water.. | ..... | ..... | ..... | 2 ounces. |
| Nitric Acid | .. | ..... | ..... | 1 drachm. |

First intimately mix the Tripoli and water, and afterwards add the Nitric Acid. This ought to be kept in a large-mouth bottle and labelled. I will here give a caution against putting bottles away without previously labelling them, as it is impossible to remember, after a lapse of time, what each solution really is.

EXCITING BATH.

| | | | |
|-------------------|------|------|------------|
| Nitrate of Silver | .... | .... | 30 grains. |
| Distilled Water | .... | .... | 1 ounce. |

Thoroughly dissolve the Silver in the water, and afterwards add one drachm of Iodized Collodion and three drops of Nitric Acid to about twelve ounces of the Silver Solution, let it stand a few minutes and filter through filtering paper.

DEVELOPING SOLUTION.

This ought to be made in two separate solutions, and then mixed together thus—

| | | |
|--------------------------|------|------------|
| Proto-Sulphate of Iron | .... | 40 grains. |
| Distilled, or Soft Water | .... | 2 ounces. |

and let it thoroughly dissolve; but as it is rather slow in doing so, a small pestle and mortar (fig. 18) will be very useful. In another vessel dissolve

| | | |
|--------------------------|------|------------|
| Nitrate of Potass | .... | 20 grains. |
| Distilled, or Soft Water | .... | 2 ounces. |

(again using the pestle and mortar, if one is at hand,) and add to the Nitrate of Potass Solution

| | | | |
|---------------------|------|------|-----------------------|
| Glacial Acetic Acid | .. | .... | $\frac{1}{2}$ drachm. |
| Alcohol | .... | .... | 20 drops. |
| Nitric Acid | .. | .... | 2 drops. |

and pour the whole of this into the Solution of Iron, when it must be filtered and it is ready for use.

FIXING SOLUTION.

In a four-ounce wide-mouth bottle, dissolve

| | | |
|--------------------------|------|------------|
| Cyanide of Potassium | .... | 20 grains. |
| Soft, or Distilled Water | .... | 2 ounces. |

and afterwards filter it. All these solutions may be made in quantity, as they will keep good almost an indefinite length of time, except the developing, which ought not to be made more than two or three weeks before it is wanted; should its action become too slow by age, the addition of a small portion of Iron will revive it.

NEGATIVE PROCESS ON GLASS.

NEGATIVE COLLODION differs from Positive mainly in the thickness of the film left on evaporation of the Ether, but also in the preparation of the Iodizing Solution, for with positives a thin film, giving a bright surface to the whites, and clearness of shadow, yet preserving the half tone in the darker portion of the picture, is indispensable; but for Negatives, a greater amount of opacity is needed; for a weak negative will not produce rich and full tones in the paper proof, while the colour of the picture is not of much moment, provided it is not foggy. In consequence of the necessity of more highly Iodizing the Collodion, together with the difference in its chemical composition, decomposition takes place much earlier; therefore, it is not expedient to iodize more than is likely to be used in the course of three or four weeks, as after that time, it begins to work much slower, requiring a longer exposure in the Camera.

FUSED NITRATE OF SILVER is produced by dissolving pure Crystals of Nitrate of Silver in distilled water, and evaporating to dryness; afterwards they are to be fused at a low temperature, which expels the remaining trace of nitric acid. A great advantage for the negative bath.

PYROGALLIC ACID, a brilliant white laminated crystal, produced by exposing Gallic Acid in a closed retort to a high temperature, is mostly used for developing negatives;

it is a salt that should be kept particularly free from damp, and not exposed to too strong a light.

IODIDE OF POTASSIUM. When the Nitrate of Silver Bath is first made, the Silver attacks the Iodide in the film of Collodion, on the prepared plate, which is plunged into it, thereby reducing the density of the coating. The remedy is in making a new bath, to add a few grains of Iodide of Potassium, which precipitating the Iodide of Silver in the form of a yellow powder, and which is afterwards, almost immediately re-dissolved, prevents the evil. Care, however, must be exercised to mix them in the order and manner hereafter described.

CITRIC ACID. During the last few months I have made many experiments with Citric Acid, and with Glacial Acetic Acid, to determine which is preferable for Negative Developing Solution; the result is, that I am satisfied Citric Acid not only works cleaner, but produces a better toned picture—I have, therefore, inserted it into the formula.

HYPO-SULPHITE OF SODA, for fixing the picture, should be used carefully, or it will interpose itself between the collodion film and the glass plate, where it is very difficult to remove. Another precaution is to wash the hands after its use, or the next picture you attempt to take will suffer, as the slightest trace of it on either the hands or cloths, will produce a smear on the glass plate, which, although not seen at first, will show in developing, and cannot be removed.

TRIPOLI AND NITRIC ACID for cleaning the plates. **ALCOHOL AND VARNISH**, which ought to be made from Amber dissolved in Chloroform, as it not only dries quicker, but gives a harder and firmer surface than any other preparation to the surface of the picture, completes the Chemicals for the Negative Process. The Solutions required are prepared from them, and the first is the

CLEANSING SOLUTION.

Directions for making this will be found at page 20, under the head of Chemicals for Positive Process.

EXCITING BATH.

| | | |
|-------------------------|------|----------------------|
| Fused Nitrate of Silver | .... | 2 drachms. |
| Distilled Water | .... | $\frac{1}{2}$ ounce. |

Dissolve—

| | | |
|-----------------------|------|-----------|
| Iodide of Potassium.. | .... | 1 grain. |
| Distilled Water | .... | 1 drachm. |

When this is dissolved, pour it into the Silver Solution; the yellow Iodide of Silver which is at first formed is almost immediately re-dissolved. The theory of this is, that Iodide of Potassium precipitates Iodide of Silver, but Iodide of Silver is soluble in a very strong solution of Nitrate of Silver; hence it is so quickly taken up again. Now add sufficient Distilled Water to make up the quantity of four ounces in all,—a fine precipitate of Iodide of Silver will be again formed, which, after standing a few hours, must be removed by filtration, and about 20 drops of Alcohol added.

DEVELOPING SOLUTION.

| | | |
|-----------------|------|------------|
| Pyrogallic Acid | .... | 8 grains. |
| Distilled Water | .... | 4 ounces. |
| Citric Acid .. | .... | 4 grains. |
| Alcohol | .... | 40 minims. |

Dissolve the Pyrogallic Acid in water first, and afterwards add the Citric Acid and Alcohol.

FIXING SOLUTION.

| | | |
|-----------------------|------|-----------|
| Hypo-Sulphite of Soda | .... | 6 ounces. |
| Soft Water | .. | 1 pint. |

If these Solutions are made previously to commencing operations, and carefully placed away from dirt or dust, not only will the process be simplified, but the cause of many failures removed.

The Pyrogallic Solution will not keep good for more than a week or ten days, therefore a larger quantity than is required for immediate use, should not be made at one time.

MANIPULATION.

POSITIVE PROCESS ON GLASS.

This branch of the art has the merit of being the simplest, and most beautiful, of the various processes by which we obtain a perfect copy of any object of interest, and may fairly claim more attention than it has hitherto obtained. Positives have been taken in great numbers during the last few years; but, of so inferior a quality, as to cast an odium upon the process, as undeserved as illiberal; the specimens have uniformly possessed a cold, flat, deathly hue, shewing merely intense blacks and chalky whites, without any half-tones or detail.

In the early days of Collodion, Positives were unknown; and then, for a long time, the only use made of the knowledge was, to prove the bare possibility of producing a positive picture without any regard to its utility; but the researches that have been lately given to the chemical constitution of Collodion, have proved, beyond dispute, that it can be manufactured with so much certainty and with such delicacy as to insure, with moderate care and practice, pictures rivalling Daguerreotypes, in amount of

detail, and quality of the half-tones. The most successful results, in this respect, that the writer has seen, have been taken by Mr. W. T. Fisher, of Great Yarmouth, and to whose kindness many valuable suggestions are due, and freely acknowledged.

The whole process may be divided into seven distinct operations, *viz.* :—

- 1st —Cleansing the Glass.
- 2nd—Giving it a Collodion coating.
- 3rd —Exciting the plate.
- 4th —Exposure in the Camera.
- 5th—Developing the latent image
- 6th—Fixing the picture; and
- 7th—Varnishing and setting.

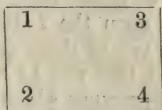
CLEANING THE PLATE.

The Glass should be cut from the best Patent Plate ; and the edges may be ground, to prevent cutting the fingers. Many operators use the “flatted crown,” which answers well for the ordinary run of pictures, but is not good enough for the best specimens, as a small scratch, or air bubble in the glass, may spoil an otherwise good portrait. Having selected pieces of glass free from blemishes, proceed to clean them by washing with water, in which a little Soda, or Cyanide of Potassium has been dissolved ; this is to free them from any trace of grease. They should afterwards be well rinsed in some clean water, and wiped dry with a clean linen cloth ; then mark one side, and rub it well with a piece of cotton wool, using the *Cleansing Solution* (page 20) ; again wash the plate with water, and wipe it perfectly dry, then lay it on a flat board or the plate holder, (fig. 8) and rub it with a wash leather. By breathing on the glass the

surface may more readily be seen, and if smears are visible, wash and clean the glass again; on no account touch the surface with the hand after it has been cleaned. The readiest way will be, to clean a stock before commencing operations, and stand them by in a Plate Box until required. If the glasses are not entirely free from grease, there will be a difficulty in running the Collodion evenly over them, the dirt would also be sure to shew in the finished picture: when you have a perfectly clean surface, blow off, with the elastic bottle, the loose dust which has settled on the plate, and proceed to give

THE COLLODION COATING,

which is best done by holding the glass by one corner, between the fore-finger and thumb of the left hand, and pouring on the centre a good quantity of Collodion, letting it run evenly over the whole surface, and finally drain off at the corner into the bottle. The inexperienced may find some little difficulty in obtaining an even film of Collodion; the readiest way will be to hold the glass by the corner marked (1)—



pouring on to the centre of the plate as much Collodion as it will easily hold; tilt the glass so as to let it run to the corner marked (2), then towards the corner it is held by, carefully avoiding the thumb, and slant in the direction of corner (3), draining it off at (4); then rest the plate in a vertical position on the neck of the Collodion bottle for a few seconds.

When the plate has been coated with Collodion, allow it about a minute to set, (in warm weather, however, the operation cannot be too quickly performed,) and immerse it in the *Nitrate Bath*, which is called

EXCITING THE PLATE.

Up to this point the manipulation may be conducted in the day light; but as the immersion of the Collodionized plate renders it sensitive to light, recourse must be had to a dark room or closet, as described in page 17; in default of this convenience, the work may be performed by the light of a candle, shaded by a screen of yellow calico or glass. Lanterns with yellow shades are made for this purpose.

The Dipping Bath (fig. 12 or 13) having been filled with the Silver Solution, place the prepared glass on the Dipper, (which is supplied with the Trough) and immerse it in the Silver Solution, steadily, but without hesitation, as the slightest pause will be sure to produce lines, that would afterwards show, in developing; when the glass has remained in the Nitrate of Silver Solution about half a minute, or more, it should be withdrawn, and again immersed two or three times, to insure the proper action of the Silver upon the Iodide in the Collodion, which will take from two to three minutes, varying with the temperature: but this will be known by its ceasing to have the greasy appearance which it at first presents. When this is the case, it should be withdrawn from the Bath, and stood on some blotting paper, just to drain, and then it is ready for the exposure in the Camera.

As the chemical constitution of the Bath is constantly altering, it is advisable to test the liquid, occasionally, before commencing; for should it be at all Alkaline, the pictures will appear foggy:—immerse in the Silver Solution a piece of blue litmus paper; if it retains its colour

after being immersed half a minute, add a drop of Nitric Acid, which has been diluted with ten times its bulk of Distilled Water; should this not be sufficient, add another drop, or more, until the paper just begins to take a pink tint. But should the pictures come out foggy when the Bath is found to be *slightly* acid, the best course will be to stand it by for a few days, and it will clear itself; many operators perplex themselves by constantly tampering with the Silver Solution. The most certain method will be to make about double the quantity required for use, and keep the surplus in a large bottle; occasionally empty the Bath into this; let it stand all night, and when the top is carefully poured off, it will generally be found to work well. In warm weather the quantity of Silver may be reduced to 25 grains to the ounce; and in winter even 35 grains will not be found too strong.

The Plate having been drained from the excess of Silver Solution, but not dried, is to be placed Collodion side downwards in the dark slide belonging to the Camera, and proceed to the fourth operation, *viz.*:

EXPOSURE.

Your sitter being placed in a proper position, and the Camera fixed on the stand, (which must be either elevated or depressed, until the image is in the centre of the ground glass,) proceed to Focus it, which is done by turning the milled-head screw on the brass front until there is a perfectly clear and defined image presented on the ground glass. This is another important point—the most perfect Lens, and greatest care in other respects, will be thrown away if this is not attended to. (A Focussing Glass, mounted either in tin or brass, will be found very convenient.) When this is done, desire the sitter to look steadily at a dark object, about the height of the Camera; remove the ground glass, replace the cap that covers the

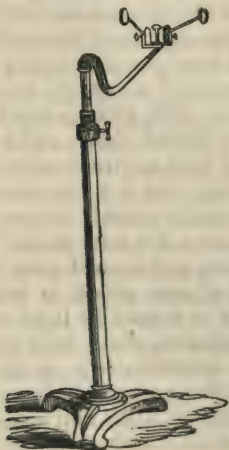
Lens, and insert the dark frame containing the Collodion plate; then take off the cap, and allow the plate to remain exposed to the influence of the light. The time of exposure will vary with the intensity of the light, and the power and aperture of the Lenses. —With the Double Combination, in an ordinary light, from six to ten seconds will be the average time required; this will be known by the appearance of the plate in the Development; but experience will afford the only guide.

For the proper production of pleasing Portraits, a Glass Room is requisite. By this, I do not mean one all glass, which is a very common fault; but one, the two ends of which are opaque, and the sides and roof glass, capable of being shaded with gauze blinds; by this means the light may be so modified as to prevent an undue quantity falling on one portion of the figure. The end of the room opposite the sitter should be painted of a dark colour, to afford rest for the eyes.

Unless the convenience of a glass room is to be had, Photographic Portraits are best taken in the open air; however, as it is not at all times feasible to do so, the photographer must arrange an apartment, according to the means he has at command; and in selecting a room, he must bear in mind that, it not only should have a good side light, but also a sky-light, if it can be obtained; a room receiving the light from the north, or north-west, is preferable to others.

In a strong light, it will be advisable to shade the top of the head, or that portion of the picture will be overdone before the darker portions of the dress are sufficiently lighted; to effect this, hang over the head of the sitter a blind of thin blue gauze, which should be suspended, if possible, two or three feet over-head, and in such a manner, that it could be wholly or partially removed: this will be found to have a very beneficial

effect in producing the half-tones, and perfecting the detail. The proper attitude of the person sitting for the portrait, must be left to the individual taste and judgment of the operator ; but avoid all exaggerated postures, so as to keep the whole of the body in one focus ; and the sitter ought to have time to get comfortably seated and accustomed to the light, before the cap of the lens is removed. It will generally be found that the most pleasing effects will be gained by taking side, or three quarter face, in preference to the direct full face, and I am rather inclined to admire portraits that are taken about half length, or even merely the head and shoulders, especially for paper pictures.

*Figure 19.**Figure 20.*

Head rests are for the purpose of steadying the head

while the portrait is being taken, the slightest movement of the sitter causing a double image, or, at least, mars the distinctness of the picture. They are made of various descriptions, either to screw to the back of the chair, as shown in the figures, or mounted on a heavy iron foot to support themselves.

The selection of a proper back ground is another matter of some importance. A simple white wall will do very well, if the light falls evenly over it; but as a general rule, something rather darker will be preferable, the exact shade is not a matter of much importance; a large blanket tightly strained over a frame gives a very good effect, if a light color is desired; but I prefer something rather darker than this, and the way I have prepared several, both for my own use and for friends, is to procure some calico sheeting, about two yards square, and having made a light wood frame the same size, nail the sheet over this, straining it tightly; then make a composition of whiting and water, adding a small quantity of yellow ochre to get the desired shade, and brush this over the screen—you will have to give it several coats to get a tolerably even surface; but it is not essential that the marks left by the brush are entirely removed as they will not show in the picture: the color should be made of the consistence of cream, and a small quantity (about half-a-pint to a pailful) of size added to prevent its rubbing off. If the sitter is dressed in light clothes, or has a remarkably fair complexion, white hair, &c., a back ground of black velvet is preferable; it throws the picture out with greater boldness; but, which ever is used, care must be taken to bring the sitter well forward, so as to prevent the flatness that will arise from the back-ground being in the same focus; and care should be taken in arranging groups, to place the several persons at the same focal distance from the Camera. Extreme colours

of dress are to be avoided, the more simple and plain the better ; if there is a choice, neither black, (especially velvet,) white or blue, are advisable ; they require such a different time of exposure, compared to the features, that something must pay the penalty—either the dress or the complexion : checks or plaids are most effective.

After this digression, we will return to the Manipulation ; and, having obtained the focus on the ground glass of the Camera, and exposed the plate to the action of the light, as directed at page 30, you must close the sliding shutter, and take the dark slide containing the plate back to the dark room, in order to

DEVELOP THE PICTURE.

On removing the plate from the Camera, there will not be the slightest trace of any image visible, but it quickly makes its appearance, by means of the Developing Solution, page 21, or FISHER'S Developing Solution, which is sold ready for use.

Having carefully excluded all white light from the operating room, hold the glass by the corner that you held it by when coating it with Collodion, and pour on a sufficient quantity of the Developing Solution to run equally over the whole surface ; if it does not flow evenly, a stain will inevitably be formed. Begin by pouring it on at one edge, running it along, and gently inclining it, to let it flow uniformly over the plate ; the first effect will be the appearance of the white lights, such as the lighter portions of the dress, &c. ; then the half-tones, and finally the darker shades ; when these appear, it should be well washed with a gentle stream of water, to remove the Developing Solution, and it is now ready for fixing, which is simply the removal of the Iodide from the surface of the Collodion film. By this time we are

able to form an opinion as to the success of our Manipulation. If, in Developing, both the high lights, as well as the half-tones, make their appearance simultaneously, and the picture presents a washy tone, the exposure has been too long ; but, on the contrary, if, after developing some time, only the high lights make their appearance, you must let the next plate remain longer in the Camera exposed to the luminous ray. Should the picture appear worth keeping, the next operation will be to

FIX THE IMAGE.

For this purpose, after having well washed the picture and removed the Developing Solution, use a solution of Cyanide of Potassium, (page 21.) The readiest way will be to pour this mixture over the plate in the same manner as the Developing Solution, until all the creamy appearance is removed ; when that is the case, it must be well washed in a good supply of water, (at least a pint should be poured over it,) and afterwards set up on edge to dry ; as the Collodion film is very tender, and liable to be rubbed off with the slightest touch, it must be protected from injury in some way, which brings us to the last operation, called

VARNISHING AND SETTING.

The usual way of doing this has been to cover the surface with a transparent varnish ; the best kind for this purpose is pure Amber, dissolved in Chloroform ; it dries with great rapidity, and prevents the annoyance caused by particles of dust settling on the surface, as is the case with those which dry more slowly. The readiest way of applying this varnish will be, to pour it over the plate in the same manner as the Collodion, draining it off into

the bottle ; if the crystal varnish is used, the plate should be warmed previously.

The picture is now finished, and may be mounted in a frame or case, with a piece of black cotton velvet behind it, or varnished with jet varnish, which should be poured over the plain side of the glass and not on the Collodion surface : to avoid this trouble, the picture may be taken on black glass, when no backing up will be required ; and it answers the purpose very well, but is rather more expensive. In mounting the pictures, put them into cases with gilt mats, or morocco trays, which are suitable for hanging up. If a Passe-Partout is used, it ought to be of a dark colour, as the white ground against a positive picture will, by contrast, spoil the tone. When properly finished and mounted, the lights and shades will be shown equal to a Daguerreotype, without its unpleasant glare.

NEGATIVE PROCESS ON GLASS.

The production of a negative picture depends mainly on the time of exposure, and the nature of the solution used in developing ; with these exceptions, you will proceed in precisely the same manner as for positives.

But, previous to describing the Manipulation, it will be advisable to clearly understand what is meant by the terms, Positive and Negative, as applied Photography.

A Positive picture, when laid upon a black cloth or other dark material, shows the lights and shades in their natural positions ; thus, the coat is transparent, therefore allows the backing of the picture to show itself through the Collodion film, whilst the opaque portions of the picture, (such as the face or hands,) will appear white from the reflection of the silver that has been deposited

there by the action of the light. Now, what is termed a Negative, is, in reality, an over-exposed Positive; to a certain extent it will show as a Positive, when laid upon a dark ground, but not effectively, for the graduations of tone, (which is the great charm of a Positive,) are not to be distinguished, and the shadows of the picture appear to be slightly foggy; but if held up to the light, and viewed as a transparency, the whole of the detail will be most faithfully seen, with the exception that those portions of the sitter, such as the hands, face or shirt front, which are white, will appear opaque or black; therefore, a Positive is also a Negative when viewed in this manner, but not of sufficient intensity to yield a copy on prepared paper.

CLEAN THE GLASSES

In the same manner as directed for the positive process, but remembering that the glass for this purpose must be really flat, or the negative will most assuredly be broken in the pressure frame: then proceed to

COAT IT WITH NEGATIVE COLLODION,

which ought to have been Iodized at least two days previously, but it is not advisable to use it after it has been Iodized more than three or four weeks. The Collodion coating is applied in the same manner as for Positives, and then

SENSITIZED

by immersing into the Nitrate Bath, prepared as directed at page 24. The plate should *not* be plunged into the silver solution immediately, but a few seconds in very

warm weather, or half-a-minute or more in colder weather, must be allowed to enable the film to set, otherwise, it will wash off the glass in the development. After the plate has been plunged into the silver solution it becomes sensitive to light; therefore, this and the subsequent operations, must be performed in the operating or dark room. The plate should remain in the exciting bath from three to four minutes, during which time it must be raised once or twice to facilitate the removal of the oily appearance, *but on no account must it be lifted out of the solution until it has been immersed at least a minute.* When the surface of the Collodion film presents a nice even film, carefully drain off the excess of silver solution and lay the glass plate in the dark side of the Camera and it is ready for exposure; observing the same care as regards the management of the light as for Positives. After having exposed the plate for the necessary time, which (other circumstances being equal,) will be about double that required for a Positive, proceed

TO DEVELOP.

The plate must be removed into the dark room, and the greatest care having been taken to exclude all white light, the developing solution, (page 24) is to be poured over the plate quick, but steadily; it must be done with great care, to prevent stains, and the solution may be diffused over the surface, more readily, by gently blowing upon the glass, which also prevents any deposit from settling, which would afterwards spot the picture. As the development of Negatives takes a much longer time than Positives, it will be found very convenient to have a stand, to rest the plate on, called a levelling stand; the plate can remain here without fatigue to the operator; it should be repeatedly examined by holding a piece of

white paper underneath, and if properly exposed, the development may be continued until the minor portion of the detail is visible, such as the shadows of a black coat. If the picture is not sufficiently intense, add two or three drops of the bath solution, but not until the picture is nearly developed.

A good Negative, when held up to the light and viewed as a transparency, will be nearly opaque in those portions of the picture which are naturally white, such as the shirt front, &c., whilst the darkest shadows are nearly transparent.

A Negative that has been exposed too long in the Camera develops rapidly at first the white portions of the drapery; the face, hands &c., start suddenly, and are quickly followed by the dark portions becoming equally opaque, presenting a uniform dull surface; the half-tones or shadows are entirely lost: while an under exposed plate develops very slowly, and does not present those graduations of light and shade that are so requisite for the production of a positive copy hereafter to be described. The conditions required for a good Negative are almost complete opacity of the high lights, and as great a transparency as possible of the darks, still showing the shadows, &c. The greatest cause of failure in Negatives consist in the want of sufficient development; this must be continued as long as possible, so as not to fog the picture.

When the development has proceeded far enough, it is to be stopped by a stream of clear water poured over it, and which can be safely done by holding the plate perfectly flat, so as to prevent the water from penetrating between the film and the glass. Having done this, it is to be

FIXED

By immersing into a shallow pan containing the Hypo-

Sulphite of Soda solution, (page 24) or this may be poured over the plate, and the surplus returned to the bottle in the same manner as Collodion : whichever method is adopted it must be allowed to remain until the yellow Iodide of Silver is completely removed, which will be the case in two or three minutes ; at this point, daylight may be admitted into the room, and by so doing, it will be easier to discover when the Iodide is removed.

It now only remains to wash away all trace of the Chemicals used in fixing ; which, if allowed to remain, would thoroughly spoil the picture, too much care cannot be taken in this respect ; afterwards, they are to be stood up to dry, and then varnished with Amber varnish to protect them from accidents ; when this is done, you may print from them any number of Positive copies on paper, without injury to the original.

FAILURES : THEIR CAUSES AND REMEDIES.

—o—

In enumerating the different obstacles that present themselves to a beginner, the first that demands our attention is, that resulting from not properly cleaning the glass plates, and the specks of dust, &c., that settle on them ; they must always be dusted the last thing before the Collodion is applied : nothing for this purpose is equal to the India-rubber bellows ; but it will be better not to clean the glasses in the same room as you coat the plates, as the dust which floats in the air is the principal cause of the black specks so often complained of.

In using Collodion, it should be borne in mind, that

the object is to obtain an even film. The general fault of beginners is to hurry this part of the operation, thinking it essential to prevent the evaporation; but if the Collodion should become too thick towards the end of the bottle, it may readily be thinned by the addition of a little Ether. Another cause of failure results from small pieces of dried Collodion that hang about the neck of the bottle, floating over the plate; this is easily to be avoided, by carefully wiping the bottle every time before using it. The other difficulty, which is the sediment of Collodion, occasions more trouble; as all Collodion, after standing a few hours leaves a deposit, called bottoms; the only precaution that can be taken is, to have a large bottle kept full, holding from four ounces to a pound, according to the quantity consumed, and when required for use, an ounce or so, carefully poured off into a smaller bottle. Long bottles with a lip and stopper, made expressly for this purpose, can be obtained, from one and sixpence to two shillings each, and will be found extremely useful.

The plate after being removed from the bath, should be exposed in the Camera, without loss of time, for if the plate gets dry, it loses its sensibility; it also must be developed without unnecessary delay.

Fogging the plate is the greatest difficulty the amateur will have to contend with, it arises from the following causes:—*over exposure of the plate*; the effect of *diffused light*; or *alkalinity of the bath*.

The first mistake is easily remedied by trying various times of exposure; and if this does not remedy the fault, you must have recourse to some other expedient. The effect of diffused light is more difficult to determine; the readiest way will be to first thoroughly examine your Camera, and observe that the sliding shutter and the door of the dark frame fit perfectly tight. (It will be

advisable to cover the Camera with a dark cloth when you have a plate in it, and raise the shutter by placing the hand underneath it.) If this seems sound, the fault may be in the developing room ; one fold of yellow calico over the window is not sufficient to prevent the admission of the chemical rays, moreover, the calico loses its color, and in time becomes perfectly useless by exposure to the light. If, after these precautions, the pictures still fog, it may be owing to too much light entering the front of the Lens. As far as possible the Camera should be kept in the dark, or the hood of the Lens must be shaded while the cap is removed. The only possible cause, in addition to these, must arise from the bath.

For Positives the bath must contain a small portion of Free Acid ; therefore, if it will not produce a clear picture, and you are satisfied it does arise from either of the above causes, immerse into the solution a small piece of Litmus Paper, which should gradually change from a pale blue to a deep pink tint : if it does not do so, after a minute or so, add a drop of dilute Nitric Acid, or more, until the desired affect is obtained—on the other hand, should the bath become too acid, which is shown by the Litmus Paper suddenly becoming a deep scarlet, the acid must be neutralized ; to do this add to the silver solution a small quantity of pure Carbonate of Soda, until no more will dissolve, when it must be filtered and again tested with the Litmus Paper : it will now be found to be rather alkaline, as shown by no change of color in the Litmus Paper ; a drop or two of Nitric Acid will remedy this, and the bath will be ready for use : but after it has been corrected it is advisable to allow it to have a day's rest before working it. There are also two other causes that prevent the bath from giving a clear picture ; one results from its becoming saturated with Ether, and is a very common fault with baths that have been in use

for a long time ; the only way of correcting this will be to pour the solution into a shallow pan and allowing it to stand a few days exposed to the air ; if it has become discoloured, add a small quantity of Kaolin, which will clear the solution ; it should then be filtered and tested for acidity, and again tested with a bath tester to ascertain if the proper proportion of silver is contained in the solution.

If the Collodionized plate is immersed too soon into the silver bath or before it has had time to set, it will produce streaks up and down the plate, something similar to those produced by removing it from the bath before the solution has penetrated the film, and in a Negative picture this fault will produce a greater inconvenience ; as, to develop a Negative, the solution will require to remain on the plate a very much longer time than for Positives, and the film is apt to become loosened and wash away : one cause of this is bad collodion, but with the best sample if the plate has been plunged into the bath too quickly, the film will not adhere.

Streaks or stains are generally caused by the developing solution not having been poured evenly over the plate, and likewise from the moisture absorbed from the wood frames in the Camera.

Blue stains in the picture are caused by not sufficiently washing the plate after the development, and results from the Cyanide of Potassium in the fixing solution mixing with the Iron, and producing a deposit of Prussian Blue on the picture. Should the fixing solution be too strong, it will destroy the film, and eat the picture into holes. The picture will also discolor on drying, if the Cyanide is not thoroughly removed, changing the whites into a dirty brown. For Negatives, the only precautions to be especially noted, besides those general rules, will be to keep the bath as near neutral as possible, that is,

if a piece of blue Litmus Paper is immersed into it for a few minutes, it ought only just to take a pink tint, should it not do so, add a drop of Glacial Acetic Acid: if the solution is too acid, it is to be neutralized by Carbonate of Soda.

The developing solution should be very carefully mixed to keep the correct portions of acid, and there will not be any difficulty; however, should the picture not have the requisite amount of density to produce a vigorous proof, proceed in a different manner, that is, after the exposure, continue the development until the shadows of the picture appear, but do not wait for the deeper tones; then wash the plate and fix it with a weak solution of Cyanide of Potassium; after it has been fixed, but not dried, mix in a clean measure two drachms of the Pyrogallic Developing Solution, and three or four drops of the Bath Solution, pour this over the picture returning it to the measure, let it flow over the plate several times, and the required opacity will quickly be obtained.

Always use a clean measure for the Developing Solution, and wash it with water after each picture, and if Hypo-Sulphite of Soda is used for fixing, it should be occasionally filtered.

PRINTING PROCESS.

ON ALBUMENIZED PAPER.

The term Printing, simply means the forming Positive copies on prepared paper, from the Negative previously obtained, and is applicable for all descriptions of Negatives.

The plan of proceeding most generally adopted, has been to saturate a sheet of paper with a solution of an

alkaline earth, allowing it to dry, and subsequently washing it with Nitrate of Silver, by which means the surface of the paper becomes covered with a chloride of that metal.

The Apparatus necessary for the purpose, will be two or three shallow porcelain pans, a glass rod, pressure frame, blotting paper, and some even grained albumenized paper. This paper can be purchased ready albumenized fit for immediate use; and, as there are many difficulties in its preparation, it will be found better to procure it than to risk the success of the future operations by attempting the manufacture.

TO EXCITE THE PAPER

Make a Solution of

| | | |
|-------------------|-------|------------|
| Nitrate of Silver | ..... | 60 grains. |
| Distilled Water | ..... | 1 ounce. |

when dissolved, filter.

A short time before required for use, it is to be rendered sensitive by floating the paper on the surface of the silver solution; therefore, fill a glass or porcelain dish to the depth of about half an inch with the silver solution, and holding the paper with both hands, the albumenized surface downwards, gently lay it in the bath, taking care not to wet the back of the paper; let it remain here for about five minutes, when it is carefully to be raised, and hung up on a line to dry.

The silver solution will require to be occasionally filtered, and as it discolours by the action of the albumen, a small portion of Kaolin should be kept at the bottom of the bottle, which will have the effect of keeping the solution clear and bright.

All this must be done in the dark room, and the paper after being excited, must not be exposed to white light, to the action of which it is now sensitive.

PRINTING THE POSITIVE.

Place the Negative, face upwards, on the glass of the pressure frame, and cover it with a piece of prepared paper marked side downwards, and interpose between it and the back board, two or three folds of flannel to prevent the glass from being broken, then bring them into close contact by closing the cross bars ; now turn up the frame and expose to the direct light of the sun.

In order to determine the time of exposure, it may be examined during the process, (by opening half the back board) but the proof should be allowed to attain a tint several shades darker than you intend it to remain, as it loses its colour in the

FIXING PROCESS.

For this purpose prepare the fixing bath—

| | | |
|-----------------------|------|------------|
| Hypo-Sulphite of Soda | .... | 3 ounces. |
| Soft Water | .... | 10 ounces. |

When the picture is removed from the pressure frame, wash it in two or three waters, to remove the excess of silver ; then place it in the fixing bath until the desired depth of colour is obtained, that is, when the face and hands are about the right shade, when it must be immediately removed and put into the TONING BATH to produce a more agreeable tone than it will have at this stage.

Dissolve—

| | | |
|-----------------------|------|------------|
| Hypo-Sulphite of Soda | .... | 2 ounces. |
| Soft Water | .... | 16 ounces. |

And in another vessel the GOLD SOLUTION, by dissolving

| | |
|------------------------|----------------------|
| Chloride of Gold | 2 grains. |
| Distilled Water.. | $\frac{1}{2}$ ounce. |

Or if the Gold Solution is purchased ready for use, use half an ounce of it. Mix them together drop by drop at a time, carefully stirring it; afterwards it is to be filtered.

The Proofs are to be immersed in this until they acquire the desired tint, which they will do in a new bath from one to two hours; but in an old one they will want a considerable longer time: when the desired tint is obtained, they are to be washed in a pan of clean water, and left in another vessel under a tap of running water for several hours, for unless all trace of the soda is removed, it will be sure to spoil the picture in a short time. When the paper is quite dry, it may be smoothed passing a warm iron over it to close the pores of the paper that have become loosened by repeated washing.

The Toning Bath will require the addition of fresh gold solution as it becomes older, to keep up its toning properties; when it is found to act slowly, the addition of two or three drops of gold will accelerate it.

Landscapes are best printed on salted paper, and likewise Portraits if it is intended to colour them, directions for which will be found in the Photographic Tourist.

STEREOSCOPIC PICTURES.



The Stereoscope furnishes the means of viewing all objects in their natural positions as regards solidity, &c.; and is the only thing requisite to make Photographic

Pictures the exact models of life. In looking at any object, one eye would not be capable of appreciating its solidity, unless assisted by the other. If we stand before any object and look steadily at it with the right eye, and then with the left eye only, it will be at once apparent that there is a very great difference in the two objects seen. To make this more plain, place a small box at the end of the room, and look at it alternately with both eyes—one eye will show the front and one side—the other will show the front and the other side; the effect of using both eyes at once, will be to show the front and both the sides at the same time. Now as ordinary Photographic Pictures are taken, they simply give a flat picture, and the only perspective is that occasioned by the distant objects being so much smaller, in proportion to the distance they are removed. The invention of the Stereoscope, however, removes this difficulty, and by its aid we are enabled to see all things in their natural proportions.

The Pictures for the Stereoscope consist of two views of the same object, taken from different points of sight.

There are two ways of taking Stereoscopic Portraits; one by means of a double Camera, taking both pictures at the same time—and the single Lens Camera, for taking them by two operations. If the intention is only to take portraits a double Lens Camera is to be preferred, as there is not the liability to spoil the picture by the sitter moving before the second view is obtained; but for distant views or groups, a Camera, constructed on Latimer Clark's principle is much more satisfactory.

To use a double Lens Camera, you coat the plate in the usual manner, and place it in the dark slide: then focus the sitter by each Lens, taking especial care that a really sharp definition is obtained on the ground glass; then insert the dark slide, and when all is ready, remove both

caps from the lenses at the same time ; when the plate has had the necessary exposure, remove to the dark room and finish the Manipulation. When the picture is finished it requires to be mounted ; if a positive it will be better to do so with the collodion side upwards, but the glass must be cut in half across the centre, and the pictures transposed, so that the left hand picture be put to the right hand of the other.

With a Latimer Clark's arrangement, there is no necessity for this to be done, as the pictures will be reversed on the glass naturally by the apparatus ; it consists of an ordinary portrait Camera, mounted on two bars, which allow it to slide from right to left ; and at the back of the Camera is an oblong frame to carry a glass large enough to hold both pictures ; this frame slides from right to left in a groove, so as to bring the whole of the glass plate at different times before the Lens ; the bars on which the Camera slides is connected with a screw at one end, by which it is adjusted, to suit various distances.

To take a Stereoscopic picture by this description of Camera, you first slide the Camera to the left and focus for the sitter, then slide the Camera to the right, and the sitter should retain its same position on the ground glass ; should it not do so, alter the position of the parallel bars, by turning the screw attached to them ; now insert into the plate holder a prepared plate and give it the necessary exposure, replace the brass cap on the Lens, slide the Camera back to the left side, also slide the plate holder to the left, remove the cap and take another picture, remove to the dark room and develop the image.

By these means a couple of portraits may be taken (both on the same glass) in less than half a minute, and as the Lens is not shifted the focus must remain the same for both pictures.

COPYING PICTURES.

The Lens best adapted for copying pictures is a single Achromatic, with a diaphragm in front, one about seven to eight inches focus, and one inch and three quarters diameter, is suitable for pictures up to $4\frac{1}{4} \times 3\frac{1}{4}$; the Camera must be rather long so as to get the focus, when the object to be copied is very close. If the Camera is not constructed in this manner, a tube of brass may be employed to lengthen the distance between the Lens and the focus screen; however, I prefer a Camera that has been especially made with a long range focus. If it is desired to copy a picture say a trifle smaller than the original, with a Lens of this description, fix your Camera on a stand about eighteen inches distance from the picture you wish to copy, and focus by moving the sliding back of the Camera either forwards or backwards, until the proper degree of sharpness is obtained. If a single Achromatic Lens is not at hand, an ordinary double Achromatic may be used, provided a stop is fixed in front on the Lens, to curtail the light. The price of a suitable Camera and Lens for copying pictures up to five inches by four inches, will be about two pounds five shillings, and one suitable for pictures up to eight inches by six inches, four pounds ten shillings.

PORTRAITS ON METAL PLATES, LEATHER, &c.

Portraits are often taken on metal plates instead of on glass, especially when required for mounting in

brooches, locketts or rings, as the metal plate can be readily cut with a pair of scissors to the required shape; these plates will not require cleaning previous to use, if they have not been soiled with the hands. They are coated with Collodion, excited, and developed in the same manner as glass Positives; the only difference to be noted is that in laying the plate in the dark slide, place a plain glass over the back previous to closing the door, or the force of the spring will bend the plate. Should the picture not appear worth keeping after it has been fixed, wash it off immediately, and the plate may be cleaned with a small pellet of cotton wool and alcohol, gently rubbing the surface with a circular motion.

Collodion Positives may be transferred to glazed linen or cloth very readily. The best method I have tried is extremely simple and effective. You first take a Positive on glass, in the usual manner, and after it has been fixed and thoroughly washed, dry it, either by holding before a fire, or any other convenient manner; then when the plate is quite cold, cover the surface with alcohol, and while still wet, lay the canvass gently over this, pressing it into close contact, and excluding the superfluous moisture and air bubbles; let it remain in this state for two or three hours, or until dry, and then the cloth may be lifted off the glass, bringing the film with it: it will not require varnishing and will bear handling to any extent.

I have succeeded better in this process by using a Negative Collodion instead of Positive, as the film is much tougher, and will bear handling to a far greater extent; of course it must be developed with the usual Positive Developing Solution, page 21. After the picture is fixed and washed, clear away the edges of the film, previous to drying it, or they will be transferred to the cloth, and give a very untidy appearance.

COLOURING PHOTOGRAPHS.

Colouring Photographic Pictures does not absolutely require a professional Artist; the outlines, &c., being already furnished, they are to be tinted by means of a little powder colour dusted over them.

The best Colours for this purpose are those prepared by Messrs. Newman; they are very finely ground, and afterwards prepared to make them adhere to the glass plate.

The Brushes are to be of the best quality, or they will spread unevenly over the picture; about three sizes will be required, made either of Camel's Hair, Goat's Hair, or Sable; they are, previous to commencing, to be pointed, by just dipping them in a vessel of water, and shaking or rolling them between the hands, so giving them a very fine point, on which the colour is taken up, (but be sure they are *perfectly dry*); then apply the colour by gently working it on the Collodion by a light circular motion, using as small a quantity of colour at one time as possible. The object aimed at is to tint the Photograph, but not more; in fact, it is impossible to lay a very large body of colour on these pictures, and even if it could be done the detail and shading would be lost. When the colour has been well worked in, blow off the excess by the India-rubber bellows.

In colouring portraits, after the face and hands have been gone over with the flesh colour, you can touch up the deep shadows with a small brush and Indian ink,

used *wet*, but great care must be exercised or the colour will flow over the plate ; moreover, too great a quantity of this touching will show ; it should only be resorted to where the picture is much deficient in shadows. When you have proceeded as far as this, the Photograph should be *varnished*, and then the remainder of the picture may be tinted—the cheeks are to be touched with a complexion tint, the flesh colour previously laid on, will form a ground to work upon ; the eyebrows and shadows of the face ought to be gone over with a little grey or black, to throw up the higher lights, &c. In colouring draperies, the lighter portions should be done first, and the darker parts filled in afterwards, and the contrast made by one colour will serve to throw up that previously done.

The greatest difficulty will be found in colouring the skies ; the light blue should first be put on, avoiding the clouds, which are finished with the horizon and distance colours—the large duster will be very convenient for toning down the tints, and a stump which is supplied will be useful in dotting the light fleecy clouds that are not to be produced by any other means.

The White (Solarization) is used for restoring the white collars, shirts, &c., which sometimes are discoloured by being over exposed, or faults in developing ; care must be taken in using this, as it holds with great tenacity to the plate.

Gold chains, rings, &c., are touched with a little gilt obtained from a Gold Shell, and is likewise to be used with caution, being very difficult to remove.

Flowers, fine buttons, or any very small articles, may be touched with a little water colour, but care must be used to prevent it spreading over the glass ; and always use the bellows for removing the superfluous colour, as the moisture from the breath would make the colours work pasty.

The following are some of the principal colours :—

| | | |
|---------------|---------------|----------------------|
| Flesh | Golden Yellow | Satin White |
| 3 Complexions | Orange | 4 Greens |
| Lips | Claret | Permt. Scarlet |
| Carminc | Distance | Pink |
| Carnation | 4 Browns | Rose |
| Damask | 4 Greys | Horizon |
| Lavender | Violet | White (Solarization) |
| 4 Blues | Puce | |
| 4 Yellows | Plum | |

For Paper Pictures ordinary water colours in cakes are to be used, but they should be such as are made expressly for this purpose, as the materials used in the manufacture of some descriptions contain substances that are injurious to the Photograph.

The picture should be taken on Salted Paper in preference to Albumenized, and must be sized previous to applying water colours, or they will run. Procure a small piece of parchment size about the bigness of a small nut, and dissolve it in about three table-spoonfuls of warm water, add to this about half the same quantity of powdered alum; now keep this constantly stirred until they are dissolved. Now lay the Photograph on a sheet of Bibulous Paper, and give it a coating of size, using a flat Camel's-hair brush for this purpose; the object is to cover the whole surface of the paper, without making any one part too wet: should there be any places that are missed, the colours will most assuredly sink into the paper; if the picture is held up to the light, by looking along the surface any inequalities may be readily detected; whilst in this state it should be preserved from dust and dried spontaneously. When the paper is dry, it should be gummed on to a card in the usual manner; but previous to doing this, it is advisable to wash the surface of

the paper with a sponge, to remove any small particles of undissolved size or alum that may remain there: however, when the picture is *perfectly dry*, but not before, it is ready to colour.

The first thing to do in colouring a Photograph, is to lay in the flesh tint, which is made by mixing Venetian Red and Carmine, with the addition of a little Yellow; this should be laid on very lightly, that is to say, the colour must be reduced by water; cover the whole of the face, hands, &c. with this wash, and allow it to dry. Now proceed to touch up the deep colours of the face; the following colours will, in different proportions, be found extremely useful:—Carmine, Pink Madder, or Crimson Lake; the colour for the lips should have a little Vermillion added to it; the shadows of the face are to be gone over with a colour produced by mixing Cobalt, Carmine, and Indian Yellow, letting either the one or the other predominate, as the nature of the subject demands. The best method of working, is to lay on the repeated touchings by crossing the strokes of the pencil, working the face, &c. in a circular direction; the strokes for the hair should be in wavy lines, not in straight scratches. In colouring the drapery, &c., care must be taken to keep the shadows well defined; if it is a black coat or cloth, a little Chinese White must be added, to give a body to the colour, say Ivory Black and Chinese White: make a rather weak wash of this colour, and shadow with Sepia and Lake, but previous to putting in the shadows, go over the body colour with a wash of thin gum water, made by dissolving the best Gum Arabic in warm water, to which a small portion of sugar has been added; the object of this is to prevent the second touches from working up the first wash. This shadow colour, with the addition of a little Indian Ink, makes a good colour for touching up Photographs that are not intended to be coloured.

WEIGHTS AND MEASURES.

All Chemicals are bought and sold by Avoirdupois weight, except some liquids which are sold by the fluid ounce; the chemical proportions given in this book are by Apothecaries' weight and fluid measure.

APOTHECARIES' WEIGHT.

| | | | | | |
|-----------|---|------------|---|-----------|----------------|
| 20 grains | = | 1 scruple. | | | |
| 60 " | = | 3 " | = | 1 drachm. | |
| 480 " | = | 24 " | = | 8 " | = 1 oz. |
| 5760 " | = | 288 " | = | 96 " | = 12 " = 1 lb. |

There are $437\frac{1}{2}$ grains in the ounce Avoirdupois.

FLUID MEASURE.

| | | | | | |
|-----------|---|-----------|---|----------|-------------------|
| 60 minims | = | 1 drachm. | | | |
| 480 " | = | 8 " | = | 1 ounce. | |
| 9600 " | = | 160 " | = | 20 " | = 1 imperial pint |

FISHER'S COLLODION.

W. T. FISHER, Great Yarmouth,

Has the satisfaction of stating that he was the first who manufactured a Collodion especially for Positives, and during the last four years he has received such Testimonials from the highest authorities, as convince him that his only has to be thoroughly tried to be appreciated by those Photographers who desire something better than the ordinary run of Positives; the whites are clear and of a good colour, without solarization, and the blacks will not be found of a slate coloured hue. If proper care is taken in the Development, for purity of tone it stands unapproachable. Another great advantage, especially to small consumers, is that after it has been iodized it *improves by keeping*: and he asserts on his own responsibility, corroborated by numberless correspondents at home and abroad, that after it has been kept twelve months, it acts quicker, and gives a more artistic Photograph than when only two or three weeks old.

The time of exposure required by this Collodion may be varied to suit the taste of the operator; with the same amount of light, either three seconds in the shade for a child to eight or nine seconds; if required for copying pictures (see his new directions). Another advantage is the cheapness, which, taking into consideration its keeping qualities, and the fact that it may be used to the last drop without waste, is sufficient guarantee.

PRICE—9s. per pound: 5s. per half-pound; 8d. per ounce.

DEVELOPING SOLUTION

Peculiarly adapted for the above (that will never stain the plate)
9d. per pint: 4s. per gallon.

For the convenience of carriage, it is sent out in a concentrated form, one quart bottle containing sufficient for a gallon, with directions for mixing.—**PRICE**, including bottle, 4s. 6d.

NEGATIVE COLLODION

Claims attention for its constancy and cleanliness; it produces good deep tones, remarkably free from spots or blemishes (termed comets) and is very tenacious, adhering to the plate whilst undergoing development, washing, &c., firmly, without cracking.

PRICE—10s. per pound; 5s. 6d. per half-pound; 9d. per ounce.

This Collodion retains its sensitiveness from a month to six weeks: quantities of half-pound and upwards are sent out in separate solutions, with directions for mixing, in which state it may be kept for any length of time.

Some beautiful specimens, (Landscapes 15 × 12) Views near London, may be seen at the London agents.

GRATIS—**FISHER'S** Directions for the use of his Collodion. W. T. F. would observe the necessity of attention to the rules he has prescribed.

Wholesale Agent—FREDERICK COX,
22, SKINNER STREET, LONDON, E.C.